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experiments indicate that, while the ganglia all have their special functions to perform, the pedal ganglia are under the direct control of the cerebral ganglia and are not capable of originating motor impulses when separated from them. Association fibers between the ganglia are well developed and impulses may finally reach muscular organs by roundabout paths when the usual paths have been destroyed. "The Influence of Grafting on the Polarity of Tubularia," by Florence Peebles. "A Study of the Germ Cells of Certain Diptera, with reference to the Heterochromosomes and the Phenomena of Synapsis," by N. M. Stevens. This article is a study of the germ cells of nine species of Muscidae and Syrphidae. The spermatogonia contain an unequal pair of heterochromosomes, and the oogonia a corresponding equal pair. The dimorphism of the spermatozoa and its relation to sex determination are the same as in many of the Coleoptera and Hemiptera. In synapsis there is a side-to-side pairing of homologous maternal and paternal chromosomes, and a similar pairing occurs in the prophase of each spermatogonial and oogonial mitosis, and also in ovarian follicle cells. "Momentary Elevation of Temperature as a Means of Producing Artificial Parthenogenesis in Starfish Eggs and the Conditions of its Action," by Ralph S. Lillie. Momentary warming of unfertilized starfish eggs, *e. g.*, to 35° for 70 seconds, during early maturation, results in membrane formation, cleavage and development to an advanced larval stage. Exposure to $n/2000$ KCN solution during, before and after such warming is highly favorable to parthenogenetic development. Initiation of development can not, therefore, depend on acceleration of oxidative processes. Apparently, processes of some other nature—hydrolytic or reducing—are most immediately concerned in fertilization in these eggs. "The Sex Ratio and Cocooning Habit of an Araneid and the Genesis of Sex Ratio," by Thomas H. Montgomery.

THE *Istituto geografico militare* of Italy, situated at Florence, has published a new edition of a most effective map of Vesuvius in

colors, on a scale of 1:25,000 (2 francs), indicating all determinable lava flows, with their dates down to 1906; also a map of Vesuvius in black, scale 1:10,000 in six sheets (4.50 francs complete), and two special maps of the cone of the volcano, 1:10,000, before and after the eruption of 1906 (each one franc). Those who are thinking of ordering the general map of Italy, 1:100,000, will do well to specify the edition "Systema Gliamas," now in course of publication in four colors (1.50 francs a sheet: 27 sheets published; édition on thin paper preferable). W. M. D.

At the sitting of the Paris Academy of Sciences on June 16 M. Poincaré gave, according to the London *Times*, particulars of a discovery by M. Devaux Charbonnel of a method of photographing the sounds of the human voice with sufficient precision to enable the record to be read. Vowels and consonants are combined with a Blondel oscillograph. The latter, which is extremely sensitive, impresses the sounds upon a photographic plate in the form of curves characteristic of each category. With a little practise it is possible to decipher these characters.

THE COCO BUD-ROT IN CUBA

AN appropriation has been approved by the provisional governor of Cuba, Hon. Chas. E. Magoon, for \$14,000 to be expended in the next year for combating the coconut bud-rot in the district of Baracoa.

The bud-rot is the most serious disease of the coconut palm. It occurs in Cuba, Jamaica, Trinidad, British Honduras, British Guiana, and perhaps in India, Ceylon and East Africa. Many years ago it spoiled the business of coconut growing in most parts of Cuba. It usually leaves a few scattered trees and this is the condition now around Havana. Even in the Baracoa district, which is especially adapted to coconuts and which escaped the disease longer than most parts of Cuba, it has existed for probably twenty years, but it has increased gradually and has only become alarming within the last few years. The total production of this district is now

estimated at two million nuts monthly (including those fed to animals), whereas it was formerly estimated at three million monthly. The decrease is due to bud-rot.

Much work has been done on this trouble in the British West Indies, where the destruction of sick trees and the use of Bordeaux mixture as a preventive have given good results.

Considerable attention has also been given to the bud-rot by the United States Department of Agriculture, which, at the request of the planters, sent Mr. Wm. Busck to Baracoa to investigate the disease in 1901. The measures which he recommended are substantially the same as those which are now to be carried out. The results of his work are given in Bulletin No. 38, Division of Entomology, U. S. Department of Agriculture. In the spring of 1904, Dr. Erwin F. Smith, of the U. S. Department of Agriculture, spent some time in Cuba studying the disease. Mr. Busck had regarded it as caused by a fungus, *Pestalozzia palmarum*, but Dr. Smith regarded it as a bacterial rot. The results of Dr. Smith's work are given in SCIENCE, N. S., Vol. XXI, No. 535, p. 500, March 31, 1905. During the past year his investigations have been continued at Baracoa and other West Indian coconut-producing points.

The subject has been written on largely by Cuban authorities, notable among whom is Dr. Carlos de la Torre, of the University of Havana; and the Department of Vegetable Pathology of the Estación Central Agronómica de Cuba has given it as much attention as possible among many other problems during nearly four years, but without being able thus far to reproduce the disease at will.

The work for which the appropriation has just been made by the Cuban government is in continuation of investigations undertaken by the Cuban Department of Agriculture through the Estación Central Agronómica in March, 1907. At this time Mr. Wm. T. Horne, chief of the Department of Vegetable Pathology of the Estación Central Agronómica, was sent to Baracoa to study means

of eradicating the disease and during the summer he made three other visits. The trouble was found widely distributed and progressing at an alarming rate. The principal work done was the treatment of several small groves with the most thorough sanitation possible—*i. e.*, dead and hopelessly sick trees were felled and burned, while new eases and suspected trees were flamed out. In two of the groves which were treated the disease was passing across, killing every tree in its path. The work showed that all trees with fairly well developed cases die. It was thought that some very early cases were saved by the flaming; at least the disease was checked. It was not stamped out in the groves, but the results were as satisfactory as could have been expected in decreasing the infection.

The work now to be undertaken is probably the most extensive measure ever adopted to control the bud-rot of coconuts and it is most sincerely to be hoped that this aid from the general government will sufficiently suppress the disease so that by a vigorous system of inspections it may be thoroughly and permanently held in check.

SPECIAL ARTICLES

REGARDING THE FUTURE OF THE GUANO INDUSTRY AND THE GUANO-PRODUCING BIRDS OF PERU¹

To the people of Peru the importance of the guano industry needs no emphasis, but it is well, first, to make clear just what is the alarming condition with which the country is confronted, and what is the object to be striven for.

Every one knows that the great ancient deposits of guano are now almost non-existent. As these deposits have been successively exhausted of various high grades, there is now left only the lowest grades that it is profitable to extract, and also some supplies of such very low grade that under present conditions they are not marketable. However, the birds are

¹ The present paper, very slightly modified from a report recently submitted to the Peruvian government and published officially in Spanish, is presented in English with the kind permission of Sr. Larrabure y Correa, Director de Fomento in Lima.